Corporate Governance and Shareholder Value in Listed Firms: An Empirical Analysis in Five Countries (France, Italy, Japan, UK, USA)

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ABSTRACT

In this paper, we design a multi-dimensional index to measure the quality of Corporate Governance systems adopted by firms and use it to investigate the correlation between Corporate Governance quality and firm value.

Unlike most studies that examine the relationship between only one dimension of Governance and firm value, we present a complex index (CGI) composed of 39 variables referable to four dimensions: Board, Remuneration, Shareholder Rights and Disclosure.

By analysing a sample of 100 large companies listed on the main stock markets in five different countries over three years (2009-2011), we confirm the widespread hypothesis of the existence of a positive and statistically significant relationship between Corporate Governance, as measured by a subset of 12 variables, and firm value.

KEYWORDS: Corporate Governance, Corporate Governance Index, firm value

1 INTRODUCTION

Corporate Governance can be defined as the system used to manage and control firms; it consists of a set of market and regulatory mechanisms which indicate how to manage a company, including the relationships among different stakeholders and the objectives of the company.

The main parties involved in Corporate Governance include authorities and regulators, markets, management, Board of Directors and shareholders. Other relevant stakeholders are financiers, suppliers, employees, creditors, clients and the external community in general. All these parties invest some kind of capital in the company (financial, physical, human, etc.), therefore they are interested in the financial and social performances of the company. A key factor in their investment decision is the level of their confidence on the ability of the firm to reach its goals, or expected results, and for this reason they are interested in how the company is managed and controlled.

Discussion is often focused on the effects of Corporate Governance mechanisms on economic efficiency, with an emphasis of shareholders' interests protection. In public companies characterized by a separation of ownership and control, Corporate Governance should be designed to solve the principal-agent problems by trying to align the interests of the two parties and design an effective control system to ensure that the Board of Directors acts respecting shareholders' rights.

This latest issue is of great relevance in the recent debate on regulatory policies: in the last decade, a renewed interest has raised towards Corporate Governance as a results of sensational defaults in 2001-2002, some of which due to financial frauds, and especially after the 2007-2009 financial crisis.

In fact, the various scandals of different nature have brought corporate Governance issues not only to the attention of regulators and policy makers, but also to the public opinion, thus increasing pressure on firms to improve their governance and disclosure mechanisms. The greatest push towards better Corporate Governance probably comes from institutional investors, who these days often, if not always, include Corporate Governance quality in their investments selection criteria.

The first evidence that institutional investors consider Corporate Governance parameters in their investment decisions come from the *Global Investor Opinion Survey* of more than 200 institutional investors in 31 countries, published by McKinsey and the Global Corporate Governance Forum in 2002.

Later studies, published by the magazines *Fortune* and *BusinessWeek*, have confirmed these evidences.

The relationships between Corporate Governance and firms value and between Corporate Governance and firms performances feed an important stream of scientific research, where our work finds place.

The contribution of our study is mainly the design of a Corporate Governance Index (CGI) that can be used to measure the quality of Corporate Governance systems in different countries. In fact, most studies use data which is characteristic of a single country; to our best knowledge, the only previous study which analyses multiple countries is the one conducted by Klapper and Love (2004); while they focus on emerging countries, our study analyses Corporate Governance systems in the largest firms in mature markets.

2 LITERATURE REVIEW

The literature on Corporate Governance is vast and still expanding.

In the years 2000, authors began to investigate the relationship between different discretional governance mechanisms and firms value. The main variables used in the first studies include ownership structure and concentration, the market for corporate control (M&A and hostile takeovers), managers compensation and incentives schemes, the number of board members and board composition (in terms of incidence of independent members) (Gupta, et al., 2009).

More recently, scholars have started to investigate the impact of Corporate Governance on firm value using more comprehensive measures than a single governance mechanism or specific variables. For this purposes, several indexes have been proposed to measure the quality of Corporate Governance systems adopted by firms.

One of the first studies in this direction is the one by Patel and Dallas (2002). They investigate transparency and disclosure of the main global firms by using the T&D ranking, an index composed of 98 questions grouped in three categories: "*ownership structure and investor rights*", "*financial transparency and information disclosure*", and "*board and management structure and process*". They find that firms with a higher value of the index have a lower market risk and higher price-to-book value, therefore firms should improve disclosure and transparency in order to lower their cost of equity.

Gompers et al. (2003) are the first authors to build a comprehensive index able to evaluate Corporate Governance in all its aspects. Their G-Index is composed of 24 distinct Corporate Governance provisions and grouped in 5 categories, all related to anti-takeover defence. The index measures the practices limiting shareholders rights, therefore to higher values of the index correspond worse governance systems. The authors investigate the relationship between G and firms performances for a sample of 1500 listed firms in the period 1990 to 1999 and find that G is strongly correlated with stock performances, Tobin's Q, net profit margin and sales growth, while the correlation with ROE is not significant. Therefore they argue that firms with better shareholders rights have higher valuations, higher sales growth and lower capital expenditures.

Core et al. (2006) criticise these results, arguing that it is not true that a better governance determines higher extra-returns, and that in other periods this relationship is inverted: firms with poor governance have low operating performances, but higher extra-returns if compared with firms with better governance. They believe that the extra-returns documented by Gompers et al. (2003) are specific of the period of their study.

An approach similar to Gompers et al. (2003) is employed by Bauer and Günster (2004), who analyse firms of the FTSE Eurotop 300 index in 2000 and 2001 using the "*Deminor Corporate Governance Ratings*", an index composed of 300 criteria grouped in four categories: "*Rights and Duties of Shareholders*", "*Range of Takeover Defences*", "*Disclosure on Corporate Governance*" and "*Board Structure and Functioning*". Contrary to Gompers et al. (2003), Bauer and Günster (2004) find a negative but insignificant relationship between the Corporate Governance standards and firm performances measured by the net profit margin and the return on equity.

In 2008, Bauer et al. replicate the study for Japanese firms and find that, after adjusting for market risk, dimension and book-to-market effect, a portfolio composed of well-governed firms obtains an extra-return of 15% higher than a portfolio made of bad-governed firms. More in details, investigating the relationship between six categories of governance variables and stock performance, the authors find that only financial transparency, internal controls, shareholders' rights and compensation schemes have a significant impact on financial performances on the Japanese market.

Another study which moves from the results of Gompers et al. (2003) is the one performed by Bebchuk et al. (2008), who identify a subset of the 24 governance practices composing the G-index which are significantly correlated with value. The authors build an "*Entrenchment index*" (E-index) using only 6 variables which are correlated with Tobin's Q and demonstrate that an increase in the index value (which corresponds to worse governance performances) is associated with sensibly negative extra-returns in the period from 1990 to 2003. They show that the remaining 18 variables are not correlated with firm value. The authors argue against complex indexes which use a large number of variables, because many of them may not be correlated with value, or they are determined by other variables. They go further explaining that such complex indexes which include variables not correlated with value may be wrong measures of the quality of governance and that using them may induce firms to adopt counter-productive governance mechanisms.

While the studies conducted by Gompers et al. (2003) and by Bebchuk et al. (2008) use only variables connected to anti-takeover practices (external governance), the Gov-Score index designed by Brown and Caylor (2006) includes variables regarding both internal and external governance practices, grouped in eight categories: "*audit*", "*board of directors*", "*charter/bylaws*", "*director education*", "*executive and director compensation*", "*ownership*", "*progressive practices*" and "*state of incorporation*". The authors find that the Gov-Score is positively and significantly correlated with the firm value measured by Tobin's Q for a sample of 1868 US firms in 2002. They also find that not all the variables are equally significant, thus supporting the argument that the governance practices really impacting on firm value are few, as proposed by Bebchuk et al. (2008). Brown and Caylor (2006) and Bebchuk et al. (2008) agree on the identification of two governance practices which are correlated to firm value: "no poison pill" and "no staggered board". Brown and Caylor (2006) demonstrate that their results are robust, not affected by endogeneity or reverse causality and that their index is more correlated to value than the entrenchment index created by Bebchuk et al. (2008).

The studies already illustrated rely on proprietary data which are not publicly available; on the contrary, the Report on Business (ROB), published by Globe and Mail in October 2002, calculates governance scores using an aggregated index for firms listed on the Toronto Stock Exchange and make them freely available. A number of empirical studies use the ROB as a measure of the quality of Corporate Governance, thus investigating the relationship between Corporate Governance and value for the Canadian market. One of the first studies in this sense is proposed by Foester and Huen (2004), who find that in the short term Corporate Governance is important for Canadian investors: the market reacts to the news about governance ranking in a way which is statistically significant. The Corporate Governance is relevant also in the long term, but only after adjusting for risk and only if the period considered is sufficiently long.

An important contribution comes from the work of Drobetz et al. (2004), who investigate the relationship between Corporate Governance and value on the German market, using a multidimensional Corporate Governance rating (CGR) based on answers to a questionnaire. They find that CGR is strongly and positively correlated with firm value and negatively correlated with stock returns, thus confirming the results obtained by Gompers et al. (2003). They also prove that an *investment strategy which buys firms with high values of CGR and short-sells firms with low values of CGR firms earns abnormal returns of around 12% on an annual basis during the sample period.* However, Drobetz et al. (2004) use cross-sectional data and are unable to solve issues connected to endogeneity or reverse-causality.

Following Drobetz et al. (2004), Cheung et al. (2007) build a Corporate Governance Index (CGI) based on publicly available information and use it to investigate the relationship between Corporate Governance and value for the 168 largest firms listed on the Hong Kong market. They find that to higher values of the CGI correspond higher market-to-book values, a proxy of firm value.

Black et al. (2003) and later Black et al. (2006) find the same result for the Korean market; their contribution is particularly relevant because their study is one of the rare cases in which the endogeneity problem is solved with the use of instruments, and the authors prove the causality of the relationship. The identification of proper instruments has always been a great concern for scholars investigating the relationship between Corporate Governance and value; Black et al. (2003, 2006) are able to find an appropriate instrument by exploiting the peculiarities of the Korean market, but their solution cannot be replicated in other markets.

A different solution to endogeneity problems is provided by Beiner et al. (2005). They build a Corporate Governance index for Switzerland and analyse the impact of different governance mechanisms on firm value. In order to consider the inter-relation of the six different mechanisms they have identified, the authors use a set of seven equations solved simultaneously, where the dependent variables are the different governance mechanism in six cases, and Tobin's Q in the seventh case. They find a positive and significant correlation between Corporate Governance and Tobin's Q.

The 2002 ROB ratings are used also in Klein et al. (2005), who investigate the effect of ownership concentration on the correlation between the Corporate Governance score and firm value for a sample of 263 Canadian firms. They find that not all governance dimensions are significant and that the effects are different for different ownership structures; they also find that the aggregate measure is not correlated with value, regardless of ownership concentration. In particular, the authors do not find any relationship between the Board composition and independence – a variable with a considerable weight (40%) in the aggregate index - and firm value. Instead, they find that strong shareholders rights, proper compensations plans and a transparent disclosure are appreciated by investors. Supporting the thesis suggested by previous studies (Dulewicz and Herbert, 2004; Dutta and Jog, 2004; Park and Shin, 2004), they conclude that firm value is not affected by Board composition and structure.

The most recent study employing ROB scores is performer by Gupta et al. (2009). However, they do not find any significant correlation between value or firm performances and the aggregate index or any sub-index, with the only exception of the relationship between value, measured both by Tobin's Q and market-to-book ratio, and "*Board and CEO compensation score*", which is negatively correlated with value, thus confirming the results obtained by Klein et al. (2005). The authors point out that ROB scores may not be true indicators of the quality of Corporate Governance, and that the effect of governance on value may be expressed in a longer period of time, thus requiring longer time series to be properly investigated.

Additional contradictory arguments are provided by Bhagat and Bolton (2008), who claim that a better Corporate Governance as measured by the G-Index developed by Gompers et al. (2003) or by the E-Index developed by Bebchuk et al. (2008) is positively correlated with better contemporaneous and subsequent operating performance, thus confirming the results obtained by Gompers et al. (2003), but not with future stock market performance, contradicting previous findings. They argue that the different results of the investigations of different authors on this relationship depend on whether or not they take into account the endogenous nature of the relationship between governance and stock performances.

3 THE CORPORATE GOVERNANCE INDEX

The review of the literature highlights that many empirical studies focus on the relationship between a single governance variable and firms' value. For example, Yermack (1996) uses only the dimension of the Board, Hermalin and Weisbach (1991) and Bhagat and Black (2002) its composition, Demsetz and Lehn (1985) use block-holders' participations, Gompers et al. (2003) use anti take-over mechanisms. On the contrary, we believe that Corporate Governance is a complex phenomenon and, as such, it should be measured by a multi-dimensional variable.

For this reason, in order to assess the quality of the Corporate Governance systems implemented by firms, we build the Corporate Governance Index (CGI), which is composed of 39 variables belonging to 4 categories: *Board of Directors*, *Compensation*, *Shareholders' rights*, *Disclosure.*

The variables are chosen based on the recommendations of the Corporate Governance codes of 5 countries and with the intention of being of general applicability, therefore any criteria specific of the regulation in a given country has been excluded.

The codes which have been analysed are the following:

- *Code de Gouvernement D'Enterprise des Sociétés Cotées* (FRA)
- *Principles of Corporate Governance for Listed Companies* (JAP)
- *Combined Code* (UK)
- *Codice di Autodisciplina* (ITA)
- *NACD Key Agreed Principles* (USA)

Each variable can have a value comprised between 0 (worst governance practice) and 1 (best governance practice), therefore all variables have the same weight.

The index is calculated by adding the values of all the variables and normalising the sum to 100 in order to express CGI as a percentage. The value of the CGI for a firm is therefore comprised between 0 and 100.

4 VARIABLES

In order to investigate the relationship between the quality of the Corporate Governance systems as measured by the CGI and firms' value, an econometric model is implemented with firms' value as dependent variable and CGI as independent variable.

The measure we choose for firms' value is Tobin Q defined as (Market Cap + Liabilities + Preferred Equity + Minority Interest) / Total Assets.

The model includes other independent variables that are reported in previous studies to influence firms' value.

Firm size

Following several authors, including Bauer and Günster (2004), Bebchuk et al. (2008), Beiner et al. (2005), Black et al. (2006) Brown and Caylor (2006), Bubbico et al. (2012), Drobetz et al. (2004), Gompers et al. (2003), Klein et al. (2005), we use the natural log of assets as a measure of firm size. Firm size may be positively correlated with value because of economies of scale, or negatively correlated with firm size because of organisational inefficiencies (Leibenstein, 1966) or worse agency problems (Klapper and Love, 2004).

Firm age

Following Aboav et al. (2010), Gompers et al. (2003) and Shin and Stulz (2000), we include the number of years passed after firm's IPO to accounts for firm's age. Drobetz et al. (2004) argue that companies listed more recently have higher growth rates and therefore better governance mechanisms and performances. We expect a negative coefficient for this variable.

Growth

Another variable that previous studies, such as Aboav et al. (2010), Beiner et al. (2005), Black et al. (2006) and Yermack (1996), have included in the model, is growth. We therefore include annual sales growth.

Operating performances

Following Aboav et al. (2010), Bebchuk et al. (2008), Beiner et al. (2005), Black et al. (2006), Bubbico et al. (2012), Daines (2001), Gupta et al. (2009) and Yermack (1996), we include ROA as a measure of operating performances and we expect it to be positively correlated with value. We perform robustness check with alternative measures such as EBIT/Sales and Capex/Assets to measure operating performances and growth opportunities respectively.

Floating shares

Following Beiner et al. (2005) and Bhagat and Bolton (2008), we include the percentage of floating shares to account for the ownership structure, which is expected to be correlated with value as well as with governance quality. The sign of the relationship between the ownership structure and value is not clear; the presence of a large shareholder is reported to impact negatively, due to low minority shareholders' protection, by Barclay and Holderness (1989) and Dyck and Zingales (2004); on the contrary, according to the "monitoring hypothesis" advanced by Shleifer and Vishny (1986), the higher concentrations favours better monitoring, with a positive effect on value.

Leverage

Following Black et al. (2003), Drobetz et al. (2004) and Klein (2005), we include leverage because several theoretical and empirical previous studies show its relationship with firm value.

Jensen (1986, 1993), Stulz (1990) and Hart and Moore (1995) suggest that debt discourages managers from over-investing the free cash flows and improves performance thanks to the monitoring exercised on managers by the banks.

However, the effect on debt seems to vary according to other conditions, such as the availability of profitable investment opportunities. McConnell and Servaes (1995) empirically find that leverage is positively correlated with value for firms with poor investment opportunities, confirming that debt solves the problem of excessive investments. Anyway, Agrawal and Knoeber (1996) and Beiner et al. (2004) do not find any relationship between leverage and firms' performances and argue that leverage is used at its best in conjunction with other governance mechanisms. Jensen (1986) argues that mature firms with stable cash flows should use more debt in order to discipline managers, but for firms with high growth opportunities debt service limits the ability of the management to pursue profitable investments, thus creating an "underinvestment" issue (Myers, 1977), which has a negative effect on value.

5 DATA ANALYSIS

5.1 SAMPLE

The original sample we choose is made of the 20 firms with the highest market capitalisation in each of the 5 countries analysed: France (Euronext), Italy (Borsa Italiana, part of the LSE group), Japan (Tokyo Stock Exchange), UK (London Stock Exchange) and USA (Nasdaq and New York Stock Exchange).

For each firm we collect Corporate Governance data for three years, 2009, 2010 and 2011, thus obtaining panel data, and calculate the CGI. Governance data is obtained from publicly available documents such as the "*proxy statement*" and the "*form-20*" for the US firms, the "*document de référence*" for French firms, the "*annual report*" and the "*notice of shareholders meeting*" for British firms and for Japan, and the "*Report di Corporate Governance*" for Italian firms.

Data source for all other variables data is Bloomberg, except for the years from IPO for which the source is Datastream.

From the original sample of 100 firms, 4 firms (China Southern Airlines, China Mobile Hong Kong, Royal Dutch Shell and Petroleo Brasileiro) are excluded because data is not available in Bloomberg, and 1 firm (Fanuc) is excluded because data on Corporate Governance is not available.

Errore. L'origine riferimento non è stata trovata. reports the main descriptive statistics of the CGI for the sample firms in the 5 countries for the period 2009-2011.

CGI	Average	Min	Q1	Median	Q3	Max	St. Dev
Total	65.297	35.557	56.201	67.580	74.388	87.612	12.722
France	69.307	56.427	65.746	69.283	73.765	83.650	6.0303
Italy	56.651	37.606	51.259	55.961	61.971	74.453	8.1777
Japan	52.184	35.557	41.665	51.923	62.645	75.098	11.071
UK	76.189	44.674	72.119	79.986	83.218	87.612	10.410
USA	73.047	62.483	69.216	73.507	76.457	84.308	5.3876

Table 1 - Statistics for CGI in France, Italy, Japan, UK and USA (2009-2011)

5.2 CORPORATE GOVERNANCE AND FIRM VALUE

To investigate the relationship between Corporate Governance, as measured by the CGI, and the firm value, we perform four different econometric analysis.

First, we apply an OLS model to cross-sectional data for each of the three years 2009, 2010 and 2011. We find that variables are correlated with the residuals, thus violating one of the basic assumptions of the linear regression model. We conclude that OLS estimates are unreliable and we do not report them.

Second, in order to tackle the endogeneity problem, we apply a two-stage least squares model (TSLS) using the percentage of independent board members, a well accepted proxy of good governance, as instrumental variable. We recall that proper instruments should be significant and exogenous: they must be correlated with the replaced variables and uncorrelated with the model error term ε_i. In our case, we use the Wald test to prove that the instruments are significant, but we fail to identify additional instruments to investigate whether the chosen instrumental variable is exogenous. We proceed to estimate a TSLS model, but the poor results of the Hausman test do not support the hypothesis that TSLS estimates are better than OLS. As we cannot prove that all instruments are exogenous, we consider TSLS results unreliable and do not report them.

Third, we analyse the data for the three years together, applying data panel techniques. In particular, first we apply Pooled OLS regression, Fixed Effects (FE) model and Random Effects (RE) model, then we use a WLS estimator because of the persistence of heteroskedasticity. Panel data results are reported in the next section.

Finally, we eliminate unimportant components of the CGI index using the Wald test and identify a reduced CGI with only 12 variables and use it to replace CGI in the WLS regression, obtaining a positive and strongly significant correlation between Tobin's Q and reduced CGI.

5.3 PANEL DATA ANALYSIS

Our data is longitudinal, that is it is characterised by a large number of individuals N and a small number of periods T. In this cases, the econometric model should focus on the heterogeneity among individuals, eventually cleaning from the effects of time which are common to all individuals.

Therefore, to analyse panel data we start from the general equation

$$y_{it} = \alpha_{it} + \boldsymbol{\beta}_{it} \cdot x_{it} + \varepsilon_{it}$$

and use three different models: Pooled OLS, Fixed Effects (FE) and Random Effects (RE), which use different assumptions on the error term ε_{it}, while the coefficients vector $\boldsymbol{\beta}_{it}$ is invariant.

The Pooled OLS model can be written as

$$\alpha_{it} = \alpha \text{ e } \boldsymbol{\beta}_{it} = \boldsymbol{\beta} \rightarrow y_{it} = \alpha + \boldsymbol{\beta} \cdot x_{it} + \varepsilon_{it}$$

It assumes that the intercept and the regressors coefficients are constant over time and across firms, while the differences among firms are captured by the error term.

The FE model, which considers the intercept varying across firms (one way), while the slope is constant, can be written as follow:

$$\alpha_{it} = \alpha + \mu_i \text{ e } \boldsymbol{\beta}_{it} = \boldsymbol{\beta} \rightarrow y_{it} = \alpha_i + \boldsymbol{\beta} \cdot x_{it} + \varepsilon_{it}$$

Finally, in the RE model the intercept varies across firms and time (two-ways), while the slope is constant. It can be written as:

$$\alpha_{it} = \alpha + \mu_i + \tau_t \text{ e } \boldsymbol{\beta}_{it} = \boldsymbol{\beta} \rightarrow y_{it} = \alpha_{it} + \boldsymbol{\beta} \cdot x_{it} + \varepsilon_{it}$$

5.3.1 POOLED

$$Q_{TOBIN\,it} = \alpha + \beta_1 \cdot ITA_i + \beta_2 \cdot JAP_i + \beta_3 \cdot UK_i + \beta_4 \cdot USA_i + \beta_5 \cdot ln(Assets)_i + \beta_6 \cdot ln(Age)_i + \beta_7 \cdot Growth_i + \beta_8 \cdot Floating_i + \beta_9 \cdot ROA_i + \beta_{10} \cdot Debt\_to\_Eqy_i + \beta_{11}\, ln(CGI)_i + \beta_{12} \cdot ITA\_CGI_i + \beta_{13} \cdot J\_CGI_i + \beta_{14} \cdot UK\_CGI_i + \beta_{15} \cdot USA\_CGI_i + \varepsilon_i$$

This model ignores the differences among firms and time and uses an OLS estimator on all the observations. Given the results of the cross-sectional analysis, we expect from the pooled regression significant coefficients and a good R^2, but very low levels of the Durbin-Watson test, indicating the presence of autocorrelation or an incorrect specification of the model.

The output results reported in Table 2 confirm our expectations. In fact, some coefficients are significant, R^2 (0.62125) is acceptable, but Durbin-Watson statistics is low (0.419514).

This model ignores the panel structure using restrictive hypothesis, but it is to be recalled that N individual observations for T periods are not the same as NT different individuals. Instead, considering the panel structure of the data allows to decompose the variability into two components, one due to time and referred to as "within", and one due to heterogeneity among individuals, referred to as "between".

Model: Pooled OLS, Nr obs: 285, inc. 95 cross-section units
Periods: 3
Dep var: TOBIN_Q

	Coeff	std err	t	p-value	
Const	1.95451	0.830220	2.354	0.0193	**
l_Assets	-0.0404045	0.0141991	-2.846	0.0048	***
l_Age	0.0639278	0.0372334	1.717	0.0871	*
ROA	11.5600	0.664259	17.40	2.42e-46	***
DEBT_TO_EQY	0.0418098	0.0132396	3.158	0.0018	***
Growth	0.168112	0.325133	0.5171	0.6055	
Floating	-0.265421	0.155375	-1.708	0.0887	*
l_CGI	-0.0309536	0.170070	-0.1820	0.8557	

Av. Dep var	1.495459	Std dev dep var	0.816459
R-squared	0.621250	Adj R-squared	0.611678
F(7, 277)	64.90749	P-value (F)	8.62e-55
Rho	0.808087	Durbin-Watson	0.419514

Table 2 - Pooled OLS model

5.3.2 INTERCEPT VARYING ACROSS INDIVIDUALS (ONE-WAY): FE AND RE MODELS

$$Q_{TOBIN_{it}} = \alpha + \sum_{k=1}^{94} (\mu_k \cdot D_{ki}) + \beta_1 \cdot ln(Assets)_{it} + \beta_2 \cdot ln(Age)_{it} + \beta_3 \cdot Growth_{it} + \beta_4 \cdot Floating_{it} + \beta_5 \cdot ROA_{it} + \beta_6 \cdot Debt\_to\_Eqy_{it} + \beta_7 \, ln(CGI)_{it} + \beta_8 \cdot ITA\_CGI_{it} + \beta_9 \cdot J\_CGI_{it} + \beta_{10} \cdot UK\_CGI_{it} + \beta_{11} \cdot USA\_CGI_{it} + \varepsilon_{it}$$

This model allows to consider the variability among firms by allowing the intercept to vary for the different individuals, while keeping the regressors coefficients constant. The intercept is modelled as $\alpha_{it} = \alpha + \mu_i$, and μ_i has to be investigated.

Two cases are possible: μ_i can be deterministic or stochastic. In the first case we apply a Fixed Effects model (FE), in the second case a Random Effects model (RE).

5.3.3 INTERCEPT VARYING ACROSS INDIVIDUALS (ONE-WAY): FE MODEL

The FE model eliminates the individual characteristics (μ_i) using the so called *within transformation* (or *fixed effect transformation*), which regresses ($y_{it} - y_i$) against ($x_{it} - x_i$), where, in our case, y_{it} is Tobin's Q, while x_i are the averages of the variables during the three time periods. In the FE model we use an estimator which is robust for the covariance matrix. Given that panel data has characteristics common to time series and to cross-section, in general it should be expected that the robust estimate of the covariance matrix should deal with heteroskedasticity and with autocorrelation (HAC approach). Additional points of attention include the possibility that the variance of the error term varies among cross-sectional units and that the covariance of the errors among the units can be not null in a given period.

We therefore use the estimator suggested by Arellano, which of data with large N and small T, like in our case, is HAC. Arellano estimator is

$$\widehat{\sum_A} = (X'X)^{-1} \times \sum_{i=1}^{n} (X'_i \, \hat{u}_i \, \hat{u}'_i \, X_i) \times (X'X)^{-1}$$

where X is the regressors matrix, $\hat{u}_i$ is the residuals vector for the unit i, and n is the number of cross-sectional units. The output of the FE model is depicted in Table 3.

The same results can be obtained with the Least-Squared Dummy Variable regression model (LSDV), which we apply by introducing 94 dummy variables (for 95 observations), one for each firm except for one firm, Wells Fargo, which is considered as the base case intercepts are referred to. LSDV results are provided in the Appendix, Tables I and II.

LSDV gives an improved R^2 (0.935102) and a higher Durbin-Watson statistics (1.385729).

Model: FE, Nr obs: 285, inc. 95 cross-section units
Dep var: TOBIN_Q
Robust std err (HAC)

	Coeff	std err	t	p-value
Const	13.5606	7.82849	1.732	0.0849 *
l_Assets	-0.479993	0.299313	-1.604	0.1105
l_Age	0.0525902	0.165929	0.3169	0.7516
ROA	3.54808	1.71803	2.065	0.0403 **
DEBT_TO_EQY	0.0638691	0.0333923	1.913	0.0573 *
Growth	0.0828064	0.194636	0.4254	0.6320
Floating	-0.237868	0.201694	0.1567	0.8756
l_CGI	0.0316125	0.201694	0.1567	0.8756

Av. Dep var	1.495459	Std dev dep var	0.816459
R-squared	0.935102	Adj R-squared	0.899283
F(101, 183)	26.10681	P-value (F)	2.67e-72
Rho	-0.204721	Durbin-Watson	1.385729

Test for the difference in the group intercepts
Null hp: groups have a common intercept
Test stats: F(94, 183) = 9.41485, with p-value = P(F(94, 183) > 9.41485) = 1.28526e-37

Wald test for heteroskedasticity
Null hp: units have error variance in common
Asymp stats test: Chi-square (95) = 1.9176e+10, with p-value = 0

Table 3 - Fixed-effects model

Although the FE and the LSDV models give always the same numerical results, an advantage given by LSDV is that with this model it is possible to obtain the α_i for each firm, while FE reports a single intercept, which is usually the average of all the individual α_i.

The constant terms α_i capture the effect of variables varying from firm to firm, but are time invariant; the within estimator therefore considers only heterogeneity among different individuals (within), but not heterogeneity in the same individual in different periods of time (between). An evident limit of this approach is that it is not possible to include in the model regressor with a value constant over time for an individual such as, for example, the industry.

It is interesting to notice that in our model the coefficients of the first 20 dummy variables, corresponding to the French firms, are significant with a 5% confidence level and their effect could be captured by a single country dummy variable, thus reducing the number of variables used in the model.

The test in Table 3 reports that the use of the robust estimator is not sufficient to eliminate heteroskedasticity. For this reason, we apply the method of the Weighted Least Squares (WLS), whose results are summarized in Table 4.

Model: WLS, Nr obs: 285, inc. 95 cross-section units
Dep var: TOBIN_Q
Weights based on unit error variance

	Coeff	std err	t	p-value	
Const	1.59798	0.232695	6.867	4.30e-11	***
l_Assets	-0.0337498	0.00489815	-6.890	3.75e-11	***
l_Age	0.0574554	0.0125529	4.577	7.13e-06	***
ROA	10.1264	0.334275	30.29	6.61e-90	***
DEBT_TO_EQY	0.0236623	0.00450021	5.258	2.91e-07	***
Growth	-0.0362783	0.0928283	-0.3908	0.6962	
Floating	-0.0990942	0.0433952	-2.284	0.0232	**
l_CGI	-0.00915840	0.0486073	0.1884	0.8507	

Statistics based on weighted data			
R-squared	0.862971	Adj R-squared	0.859509
F(2, 277)	249.2109	P-value (F)	1.4e-115
Statistics based on original data			
Average dep var	1.495459	st dev dep var	0.816459

Table 4 - WLS model

5.3.4 FE MODEL VS. RE MODEL

The Random Effects model (RE) treats individual effects as part of the error term, as stochastic components uncorrelated with regressors. It is therefore possible to include in the matrix X variables that vary between different individuals, although they remain constant within the same individual; this is not possible with the FE model.

The most appropriate model to describe the relationship between Corporate Governance and firm value can be chosen with the aid of three statistical tests, reported in Table 5. The first test investigates the presence of significant individual effects; in our case, the p-value is very low (1.28886e-35) and the null hypothesis - the absence of combined significance of the group averages – is rejected. For this reason, the FE model is considered more appropriate than the Pooled OLS regression.

The Breusch-Pagan test is used to compare the RE model with the OLS pooled. Also in this case the p-value is very low (3.13866e-27), favouring the RE model.

Finally, the Hausman (or Durbin-Wu-Hausman) test compares the FE and the RE models and its results indicate that the FE model is more appropriate to describe the phenomenon under investigation.

Before analysing the results of the FE model, we verify if heterogeneity due to time should also be considered, along with fixed effects. We therefore include dummy variables to investigate differences in the intercepts due to time.

As expected due to the very low differences in CGI average values for the three years, we find that there are not significant differences between the time periods. In fact, the coefficients of the two dummy variables are not significant and, performing the Wald test, we cannot reject the null hypothesis of combined significance of the two dummy variables (Table 6).

These final results confirm that the FE model is appropriate to describe the relationship between CGI and firms' value, as illustrated in the next section.

Diagnosis: hp of balanced panel with 95 cross-section units for 3 periods

Fixed-effects estimator
Allows different intercept for each cross-section unit
Std err of slope in round brackets, p-value in square brackets

Const	13.561	(4.4107)	[0.00243]
l_Assets	-0.47999	(0.17861)	[0.00787]
l_Age	0.05259	(0.27344)	[0.84770]
ROA	3.5481	(0.98546)	[0.00013]
DEBT_TO_EQY	0.063869	(0.028146)	[0.02442]
Growth	0.082806	(0.20644)	[0.68909]
Floating	-0.23787	(0.27657)	[0.39088]
l_CGI	0.031612	(0.28616)	[0.91216]

95 group averages have been subtracted from data

Residuals variance: 12.2863 / (285 – 102) = 0.0671384
Combined significance of different averages in groups:
F (94, 183) = 9.41485, with p-value 1.28526e-37
(a low p-value rejects the hp that pooled OLD model is appropriate, in favour of FE)

Breusch-Pagan test
LM = 110.078, with p-value = prob (chi-square (1) > 110.078) = 9.42314e-26
(a low p-value rejects the hp that pooled OLS model is appropriate, in favour of RE)

Variance estimators:
Between = 0.201557
Within = 0.0671384
Theta used for quasi-demeaning = 0.666784

Random-effects estimator
Allows different error term for each unit
Std err of slope in round brackets, p-value in square brackets

Const	2.5688	(1.0652)	[0.01654]
l_Assets	-0.075253	(0.021533)	[0.00055]
l_Age	0.080494	(0.058586)	[0.17057]
ROA	7.5345	(0.73898)	[0.00000]
DEBT_TO_EQY	0.032172	(0.017666)	[0.06967]
Growth	0.01409	(0.21148)	[0.94693]
Floating	-0.1355	(0.19102)	[0.47870]
l_CGI	0.060744	(0.20456)	[0.76672]

Hausman test:
H = 54.6344, with p-value = prob (chi-square (7) > 0.54.6344) = 1.76146e-09
(a low p-value rejects the hp that RE is appropriate, in favour of FE)

Table 5 – tests for the choice of the appropriate model

Model: FE, Nr obs: 285, inc. 95 cross-section units
Periods: 3
Dep var: TOBIN_Q
Robust std err (HAC)

	Coeff	std err	t	p-value
Const	10.2658	7.17463	1.431	0.1542
l_Assets	-0.408688	0.279289	-1.463	0.1451
l_Age	0.420594	0.349102	1.205	0.2299
ROA	3.95032 **	1.85382	2.131	0.0344
DEBT_TO_EQY	0.0620889	0.0360549	1.722	0.0868 *
Growth	0.104956	0.204766	0.5126	0.6089
Floating	-0.272276	0.502466	-0.5419	0.5886
l_CGI	0.103372	0.188444	0.5486	0.5840
dt_2	-0.0559186	0.0481140	-1.162	0.2467
dt_3	-0.0901423	0.0575925	-1.565	0.1193
Av. Dep var	1.495459	Std dev dep var	0.816459	
R-squared	0.935926	Adj R-squared	0.899464	
F(101, 183)	25.66861	P-value (F)	2.29e-71	
Rho	-0.209918	Durbin-Watson	1.393454	

Test for the difference in the group intercepts
Null hp: groups have a common intercept
Test stats: F(94, 181) = 9.33256, with p-value = P(F(94, 181) > 9.33256) = 4.30736e-37

Wald test for combined significance of time dummies
Asymp test statistics: chi-square (2) = 2.67425 with p-value = 0.2626

Table 6 - FE model with time dummy variables

5.3.5 FE RESULTS

The results of the WLS model (Table 4) brings the following considerations.

The variable which has the highest effect on firms value is ROA: its coefficient is positive and high (10.1264), with p-value much lower than 1% (6.61e-90). This confirms, as we expected, that operating performances are highly relevant for investors.

Other variables which have a positive and significant correlation with value are the natural logarithm of years from IPO (coefficient: 0.0575, p-value: 7.13e-06) and leverage (coefficient: 0.0237, p-value: 2.91e-07), this latter result being coherent with the findings in Jensen (1986), Stulz (1990) and Hart and Moore (1995), who argue that debt can create value through an improved monitoring on management exercised by banks and the reduction of the free cash flows employed in unprofitable investments.

The only negative and highly significant variable (99% confidence level, p-value $< 1\%$) is the firm dimension as measured by the natural logarithm of assets (coefficient: -0.0337, p-value: 3.75e-11); the negative effects of the organisational inefficiencies suggested by Leibenstein (1966) appears more relevant than the positive effects due to the economies of scale suggested by Baumol (1959).
The Floating coefficient is also negative, but less significant (95% confidence level; p-value: 0.0232)
The coefficient of the Growth variable, measured by the average annual sales growth, is negative but not significant.
Finally, the coefficient of the natural logarithm of CGI, the variable measuring the quality of Corporate Governance systems adopted by firms, is low and positive (0.0092), but not significant, with p-value equal to 0.8507. This finding can be interpreted in one of the two following ways:

i. The Corporate Governance is not correlated with firm value
ii. The CGI is not a proper measure to evaluate the quality of the Corporate Governance from investors' perspective.

We proceed to investigate if it is possible to identify a subset of the 39 governance variables used to build the CGI which are correlated with firms value.

5.4 REDUCED CGI

In order to identify the variables which are most correlated with value, we estimate a linear regression model where the dependent variable is Tobin's Q and the CGI as dependent variable is replaced by its 39 components; the other independent variables of the previous model are also included: ln(Asset), ln(Age), ROA, Debt to Equity, Growth and Floating. The output of the Pooled OLS and the FE models with the 39 governance variables is shown in the Appendix, Tables III, IV and V. Also in this case, FE is deemed the most appropriate model.
We use a testing-down approach and find that the Wald test indicates that the variables with a negative coefficient in the FE model are unimportant and can be omitted, therefore we eliminate these variables and estimated the model again (Tables VI and VII in the Appendix). The procedure is repeated for the variables with negative coefficients in this second estimates; the Wald test allows again to eliminate such variables. The result of this process is the identification of 12 relevant variables, which are used to compose the reduced CGI, or CGI_12, which is then used in the regression, whose output is shown in the Appendix in Table VIII.

It is interesting to notice that the 12 variables still represent all of the original 4 macro areas: variable 1-6 refer to the Board area, variable 7 to compensation, variables 8-11 to Shareholders' rights and variable 12 to Disclosure, thus confirming our hypothesis that Corporate Governance is a complex phenomenon and should be measured by a multi-dimensional index.

The FE model is applied using the reduced CGI, made of 12 variables (Table 6); also in this case, the robust estimator is not able to eliminate the heteroskedasticity, thus requiring the use of the WLS estimator, whose output is reported in Table 8. The output of the WLS model using the reduced CGI is coherent with the previous results obtained using the complete CGI (Table 4), as the signs and the significance of the coefficients of the control variables are preserved, and the R^2 is still high (88.1%). In addition, using the reduced CGI, the coefficient of the variable l_CGI becomes strongly significant, with p-value equal to 0.0003, as expected.

Model: FE, Nr obs: 285, inc. 95 cross-section units
Periods: 3
Dep var: TOBIN_Q
Robust std err (HAC)

	Coeff	std err	t	p-value
Const	14.5968	7.10839	2.053	0.0415 **
l_Assets	-0.536437	0.285228	-1.881	0.0616 *
l_Age	0.0224268	0.159639	0.1405	0.8884
ROA	3.62420	1.67263	2.167	0.0315 **
DEBT_TO_EQY	0.0600735	0.0283717	2.117	0.0356 **
Growth	0.0899109	0.192840	0.4662	0.6416
Floating	-0.393546	0.528584	-0.7445	0.4575
l_CGI	0.398815	0.192571	2.071	0.0398 **

Av. Dep var	1.495459	Std dev dep var	0.816459
R-squared	0.937069	Adj R-squared	0.902336
F(101, 183)	26.97955	P-value (F)	1.77e-73
Rho	-0.222156	Durbin-Watson	1.416912

Test for the difference in the group intercepts
Null hp: groups have a common intercept
Test stats: F(94, 183) = 9.68836, with p-value = P(F(94, 183) > 9.68836) = 1.81634e-38

Wald test for heteroskedasticity
Null hp: units have error variance in common
Asymp stats test: Chi-square (95) = 1.2.77967e+06, with p-value = 0

Table 7 - FE model, reduced CGI (12 parameters)

Model: WLS, Nr obs: 285, inc. 95 cross-section units
Dep var: TOBIN_Q
Weights based on unit error variance

	Coeff	std err	t	p-value
Const	1.51577	0.129348	11.72	5.00e-26 ***
l_Assets	-0.0376355	0.00486135	-7.742	1.85e-13 ***
l_Age	0.0674218	0.0121588	5.545	6.85e-08 ***
ROA	10.1048	0.337421	29.95	7.61e-89 ***
DEBT_TO_EQY	0.0287139	0.00359160	7.995	3.54e-14 ***
Growth	-0.0156248	0.0858647	-0.1820	0.8557
Floating	-0.179490	0.0484463	-3.705	0.0003 ***
l_CGI	0.121311	0.0334525	3.626	0.0003 ***

Statistics based on weighted data

R-squared	0.881008	Adj R-squared	0.878001
F(2, 277)	292.9848	P-value (F)	4.7e-124

Statistics based on original data

Average dep var	1.495459	st dev dep var	0.816459

Table 8 - WLS model, reduced CGI (12 parameters)

6 CONCLUSIONS

The objective of the present work is to investigate the relationship between the quality of Corporate Governance systems adopted by firms and their value, and to answer o the question Are firms which adopt better Corporate Governance systems, all else equal, have a higher market value?

While most of the previous studies focus on a country, our study analyses and measures the Corporate Governance in five different countries, namely France, Italy, Japan, UK and USA.

As a measure of the quality of Corporate Governance, we build the Corporate Governance Index (CGI), a scoring model based on 39 variables grouped in 4 macro-areas: Board, Shareholders' rights, Compensation, Disclosure.

The original sample is made of 100 firms, 20 in each if the 5 countries, then reduced to 95 for a lack of data of 5 firms, observed for 3 years, from 2009 to 2011.

Statistical analysis based on average scores shows that the most advanced countries in terms of Corporate Governance are UK and USA. In addition, it has to be noted that the average score is following an increasing trend in all the 5 countries.

One of the strengths of our research is the use of panel data, which allows more robust analysis. Typical Panel data techniques allow to considerably reduce the omitted variables issue, which is very common with cross-sectional data. A confirmation to this statement comes from the data analysis presented in the paper. First, we estimate OLS models for each of the three years and find incoherent results over time. A possible explanation is an endogeneity nature of the governance variable. We them estimate a TSLS model, using the percentage of independent board members as an instrumental variable. However, the poor results of the Durbin-Wu-Hausman do not confirm is appropriate for this analysis. Finally we analyse the data as panel, using the Pooled OLS, Fixed-Effects (FE) and Random Effects (RE) estimators. Three different specification tests, including Breusch-Pagan and Hausman's test, indicate the FE model as the most appropriate model to represent this data. The results do not confirm a correlation between CGI and Tobin's Q (the coefficient is positive but not significant).

The last part of the study focuses on the search of a subset of the 39 governance variables composing the CGI which are positively correlated with value in a statistically significant way.

Applying omit tests (Wald tests), we identify 12 variables that are strongly correlated with value, and use them to compose a reduced CGI.

Our study confirms the findings of Bebchuk et al. (2008), who argue that only some aspects of Corporate Governance impact on value; It is interesting to note that, differently from Bebchuk et al. (2008), the 12 variables we find belong to all the 4 areas originally considered in the CGI: Board,

Compensation, Shareholders' rights and Disclosure. This results confirm our belief that Corporate Governance is complex and requires a multi-dimensional measure.
We conclude by offering some considerations for future developments.
First of all, our sample is made of only the largest 20 firms in the five markets we have considered, and cannot be considered representative of all the listed firms. Extending the study to include a larger number of firms with different sizes can increase generalizability.
In addition, increasing the number of periods included in the analysis will allow to consider also dynamic panel analysis.
Finally, the search for appropriate instrument variables in Corporate Governance research is still an open issue, which requires further studies to be solved.

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APPENDIX

Model: Pooled OLS, Nr obs: 285, inc. 95 cross-section units

Periods: 3

Dep var: TOBIN_Q

	Coeff	std err	t	p-value	
const	14.2210	4.78933	2.969	0.0034	***
du_1	-1.49695	1.09642	-1.365	0.1738	
du_2	-1.31938	0.647625	-2.037	0.0431	**
du_3	0.680056	0.673934	1.009	0.3143	
du_4	-0.619375	0.662041	-0.9356	0.3507	
du_5	-1.25330	0.653877	-1.917	0.0568	*
du_6	-0.618347	0.483142	-1.280	0.2022	
du_7	-2.05748	0.766308	-2.685	0.0079	***
du_8	-0.281403	0.381061	-0.7385	0.4612	
du_9	-1.30579	0.421631	-3.097	0.0023	***
du_10	-0.389652	0.468734	-0.8313	0.4069	
du_11	-0.942182	0.723246	-1.303	0.1943	
du_12	-0.740616	0.538841	-1.374	0.1710	
du_13	-0.621042	0.423979	-1.465	0.1447	
du_14	-0.763231	0.619909	-1.231	0.2198	
du_15	-0.688647	0.918867	-0.7495	0.4545	
du_16	0.906319	0.514534	1.761	0.0798	*
du_17	-0.911378	0.784726	-1.161	0.2470	
du_18	-1.67502	0.715104	-2.342	0.0202	**
du_19	-1.47838	0.945955	-1.563	0.1198	
du_20	-2.81735	1.11618	-2.524	0.0124	**
du_21	-1.01470	1.01087	-1.004	0.3168	
du_22	0.808956	0.429693	1.883	0.0613	*
du_23	-0.894716	0.443375	-2.018	0.0451	**
du_24	-1.17193	0.426388	-2.749	0.0066	***
du_25	-1.20954	0.487414	-2.482	0.0140	**
du_26	-1.45483	0.732007	-1.987	0.0484	**
du_27	-0.371893	0.801545	-0.4640	0.6432	
du_28	-1.57312	0.908800	-1.731	0.0851	*
du_29	-1.28854	0.508996	-2.532	0.0122	**
du_30	-1.03206	0.414923	-2.487	0.0138	**
du_31	-0.261895	0.281736	-0.9296	0.3538	
du_32	-0.635816	0.901111	-0.7056	0.4813	
du_33	0.623583	1.00688	0.6193	0.5365	
du_34	1.37993	1.15898	1.191	0.2353	
du_35	0.930124	0.514715	1.807	0.0724	*
du_36	1.06376	0.527511	2.017	0.0452	**
du_37	0.288347	0.255384	1.129	0.2603	
du_38	-1.50636	0.704780	-2.137	0.0339	**
du_39	0.152567	0.402660	0.3789	0.7052	
du_40	-0.191153	0.676954	-0.2824	0.7780	
du_41	0.789686	0.405813	1.946	0.0532	*
du_42	-0.489261	0.799432	-0.6120	0.5413	
du_43	0.0357318	0.281352	0.1270	0.8991	
du_44	0.299249	0.307385	0.9735	0.3316	
du_45	-1.02673	0.934126	-1.099	0.2732	
du_46	-1.92017	0.913753	-2.101	0.0370	**
du_47	-1.23618	0.876107	-1.411	0.1599	

Table I - LSDV (1/2)

du_48	-2.34885	0.965990	-2.432	0.0160	**
du_49	-1.88724	0.812437	-2.323	0.0213	**
du_50	-1.77824	0.711803	-2.498	0.0134	**
du_51	-0.392979	0.816935	-0.4810	0.6311	
du_52	0.902620	0.542685	1.663	0.0980	*
du_53	2.26530	0.977862	2.317	0.0216	**
du_54	0.773852	0.497179	1.556	0.1213	
du_55	1.92019	0.973518	1.972	0.0501	*
du_56	-1.57905	0.658006	-2.400	0.0174	**
du_57	1.01548	0.551082	1.843	0.0670	*
du_58	0.841780	0.577597	1.457	0.1467	
du_59	0.679428	0.501098	1.356	0.1768	
du_60	-2.94707	0.951280	-3.098	0.0023	***
du_61	-1.73906	0.868635	-2.002	0.0468	**
du_62	-0.825577	0.694884	-1.188	0.2363	
du_63	0.290416	0.865623	0.3355	0.7376	
du_64	-2.60964	1.25523	-2.079	0.0390	**
du_65	-1.93586	0.789892	-2.451	0.0152	**
du_66	-0.555497	0.671544	-0.8272	0.4092	
du_67	-2.55238	0.992173	-2.573	0.0109	**
du_68	-1.77230	1.26049	-1.406	0.1614	
du_69	-0.663764	0.882440	-0.7522	0.4529	
du_70	-1.15579	0.658044	-1.756	0.0807	*
du_71	-1.64623	0.714228	-2.305	0.0223	**
du_72	-1.79283	0.912118	-1.966	0.0509	*
du_73	-1.34583	0.658546	-2.044	0.0424	**
du_74	-1.64598	0.830349	-1.982	0.0489	**
du_75	0.617632	0.468540	1.318	0.1891	
du_76	-2.05988	0.773420	-2.663	0.0084	***
du_77	-0.833184	0.419547	-1.986	0.0485	**
du_78	0.861295	0.336436	2.560	0.0113	**
du_79	-0.618116	0.469502	-1.317	0.1896	
du_80	2.06890	0.918994	2.251	0.0256	**
du_81	0.469060	0.486209	0.9647	0.3360	
du_82	-1.39851	0.526636	-2.656	0.0086	***
du_83	-1.49541	0.888725	-1.683	0.0941	*
du_84	-0.165848	0.576436	-0.2877	0.7739	
du_85	-0.303626	0.409182	-0.7420	0.4590	
du_86	-1.21803	0.782604	-1.556	0.1213	
du_87	1.43551	0.640249	2.242	0.0262	**
du_88	-2.30664	0.833845	-2.766	0.0063	***
du_89	-0.492466	0.409262	-1.203	0.2304	
du_90	-0.781763	0.954081	-0.8194	0.4136	
du_91	-1.52019	0.665400	-2.285	0.0235	**
du_92	-1.55495	0.742709	-2.094	0.0377	**
du_93	-1.12913	0.503362	-2.243	0.0261	**
du_94	-0.521676	0.419289	-1.244	0.2150	
l_Assets	-0.479993	0.178611	-2.687	0.0079	***
l_Age	0.0525902	0.273440	0.1923	0.8477	
ROA	3.54808	0.905462	3.919	0.0001	***
DEBT_TO_EQY	0.0638691	0.0281459	2.269	0.0244	**
Growth	0.0828064	0.206642	0.4007	0.6891	
Flottante	-0.237868	0.276570	-0.8601	0.3909	
l_CGI	0.0316125	0.286161	0.1105	0.9122	

Av. Dep var	1.495459	Std dev dep var	0.816459
R-squared	0.935102	Adj R-squared	0.899283
F(101, 183)	26.10681	P-value (F)	2.67e-72
Rho	-0.204721	Durbin-Watson	1.385729

Table II - LSDV (2/2)

Model: Pooled OLS, Nr obs: 285, inc. 95 cross-section units

Periods: 3

Dep var: TOBIN_Q

	Coeff	std err	t	p-value	
const	4.51737	0.910412	4.962	1.33e-06	***
A1	-0.0409077	0.0433387	-0.9439	0.3462	
A2	0.0506139	0.0419682	1.206	0.2290	
A3	-0.0153497	0.0360476	-0.4258	0.6706	
A4	-0.0962653	0.0667669	-1.442	0.1507	
A5	-0.0788878	0.0630882	-1.250	0.2124	
A6	0.0693360	0.0317050	2.187	0.0297	**
A7	-0.00936549	0.0273571	-0.3423	0.7324	
A8	0.146659	0.0684054	2.144	0.0330	**
A9	-0.0220599	0.0781174	-0.2824	0.7779	
A10	0.0498378	0.0648175	0.7689	0.4427	
A11	0.0509428	0.0268855	1.895	0.0593	*
A12	-0.0129056	0.0320704	-0.4024	0.6877	
A13	0.0143100	0.0361169	0.3962	0.6923	
A14	0.0139398	0.0460217	0.3029	0.7622	
A15	-0.0347408	0.0404575	-0.8587	0.3914	
A16	0.0291345	0.0797192	0.3655	0.7151	
A17	-0.0654049	0.0373170	-1.753	0.0809	*
A18	-0.101135	0.0758697	-1.333	0.1838	
A19	-0.0823730	0.0440135	-1.872	0.0625	*
A20	-0.0156057	0.0448875	-0.3477	0.7284	
A21	-0.0704804	0.0383404	-1.838	0.0673	*
A22	0.0370119	0.0460619	0.8035	0.4225	
A23	0.122685	0.0416755	2.944	0.0036	***
A24	0.0376781	0.0389884	0.9664	0.3348	
A25	-0.0830718	0.0447410	-1.857	0.0646	*
A26	-0.0325892	0.0264974	-1.230	0.2199	
A27	-0.0170958	0.0538836	-0.3173	0.7513	
A28	-0.0864705	0.0277263	-3.119	0.0020	***
A29	0.0395726	0.0361341	1.095	0.2745	
A30	0.0494096	0.0382342	1.292	0.1975	
A31	-0.0257081	0.0449152	-0.5724	0.5676	
A32	-0.0166848	0.0421294	-0.3960	0.6924	
A33	0.130335	0.0391060	3.333	0.0010	***
A34	0.0167855	0.0339020	0.4951	0.6210	
A35	-0.0598974	0.0428113	-1.399	0.1631	
A36	-0.0277931	0.0494920	-0.5616	0.5749	
A37	0.000198052	0.0747500	0.002650	0.9979	
A38	-0.0997442	0.126771	-0.7868	0.4322	
A39	-0.222495	0.0512389	-4.342	2.08e-05	***
l_Assets	-0.0993050	0.0282827	-3.511	0.0005	***
l_Age	0.0610158	0.0383955	1.589	0.1134	
ROA	10.3790	0.772008	13.44	4.62e-31	***
DEBT_TO_EQY	0.0228398	0.0140260	1.628	0.1048	
Growth	-0.0377819	0.304220	-0.1242	0.9013	
Flottante	-0.503123	0.213132	-2.361	0.0190	**

Av. Dep var	1.495459	Std dev dep var	0.816459
R-squared	0.752352	Adj R-squared	0.705724
F(45, 239)	16.13510	P-value (F)	1.12e-50
Rho	0.544904	Durbin-Watson	0.701734

Table III – OLS model - 39 Governance variables

Model: FE, Nr obs: 285, inc. 95 cross-section units

Periods: 3

Dep var: TOBIN_Q

	Coeff	std err	t	p-value	
const	13.5600	5.48748	2.471	0.0146	**
l_Assets	−0.442712	0.219812	−2.014	0.0458	**
l_Age	−0.0960374	0.325083	−0.2954	0.7681	
ROA	3.86694	1.07355	3.602	0.0004	***
DEBT_TO_EQY	0.0636788	0.0333958	1.907	0.0585	*
Growth	0.00385748	0.246197	0.01567	0.9875	
Flottante	−0.875661	0.463637	−1.889	0.0609	*
A1	−0.0478441	0.0486557	−0.9833	0.3270	
A2	0.0901912	0.0598868	1.506	0.1342	
A3	−0.0233080	0.0501613	−0.4647	0.6429	
A4	0.0765728	0.0767013	0.9983	0.3197	
A5	0.0161558	0.0732468	0.2206	0.8257	
A6	0.0332250	0.0354164	0.9381	0.3497	
A7	0.0125768	0.0227929	0.5518	0.5819	
A8	−0.0137986	0.0680040	−0.2029	0.8395	
A9	0.0296032	0.0907485	0.3262	0.7447	
A10	−0.105388	0.0885484	−1.190	0.2359	
A11	0.0583406	0.147052	0.3967	0.6921	
A12	−0.0788338	0.0979528	−0.8048	0.4222	
A14	0.00413645	0.0993128	0.04165	0.9668	
A15	−0.0315015	0.0404759	−0.7783	0.4376	
A16	−0.0859322	0.0765278	−1.123	0.2633	
A17	−0.0391757	0.0476034	−0.8230	0.4118	
A18	0.0487307	0.0717195	0.6795	0.4979	
A19	−0.0975813	0.0443739	−2.199	0.0294	**
A20	0.000540566	0.100289	0.005390	0.9957	
A21	0.0692044	0.0914736	0.7566	0.4505	
A22	0.000200897	0.0677462	0.002965	0.9976	
A23	−0.0274148	0.0751275	−0.3649	0.7157	
A24	0.191125	0.126391	1.512	0.1326	
A25	−0.0661415	0.105706	−0.6257	0.5325	
A26	−0.00187639	0.130602	−0.01437	0.9886	
A27	−0.101851	0.113162	−0.9000	0.3695	
A28	−0.247023	0.171495	−1.440	0.1518	
A29	0.0299729	0.0628596	0.4768	0.6342	
A31	0.100650	0.145892	0.6899	0.4913	
A32	−0.0233794	0.139125	−0.1680	0.8668	
A33	0.0156760	0.129211	0.1213	0.9036	
A34	−0.0239757	0.0833410	−0.2877	0.7740	
A35	0.00949865	0.129963	0.07309	0.9418	
A36	−0.00656431	0.0809765	−0.08106	0.9355	
A39	0.0206997	0.0815085	0.2540	0.7999	

Av. Dep var	1.495459	Std dev dep var	0.816459
R-squared	0.943288	Adj R-squared	0.891904
F(135, 149)	18.35773	P-value (F)	4.57e-54
Rho	-0.270566	Durbin-Watson	1.515617

Table IV - Fixed-effects model - 39 Governance variables (1/2)

Test for the difference in the group intercepts
Null hp: groups have a common intercept
Test stats: F(94, 149) = 5.33664, with p-value = P (F (94, 149) > 5.33664) = 7.38052e-20

Test for omitted variables
Null hp: parameters equal to zero for the variables
A1
A3
A8
A12
A15
A16
A17
A25
A27
A28
A32
A34
A36
Test stats: F(13, 149) = 0.604938, with p-value = P (F (13, 149) > 0.604938) = 0.847289

Table V - Fixed-effects model - 39 Governance variables (2/2)

Model: FE, Nr obs: 285, inc. 95 cross-section units

Periods: 3

Dep var: TOBIN_Q

	Coeff	std err	t	p-value	
const	13.1239	4.85008	2.706	0.0075	***
l_Assets	−0.464247	0.197082	−2.356	0.0197	**
l_Age	−0.0597024	0.306949	−0.1945	0.8460	
ROA	3.73172	0.997922	3.739	0.0003	***
DEBT_TO_EQY	0.0582136	0.0307342	1.894	0.0600	*
Growth	0.0570013	0.232874	0.2448	0.8069	
Flottante	−0.565667	0.376129	−1.504	0.1345	
A2	0.0447492	0.0441206	1.014	0.3120	
A4	0.0434654	0.0668470	0.6502	0.5165	
A5	−0.000500343	0.0630694	−0.007933	0.9937	
A6	0.0229224	0.0329294	0.6961	0.4874	
A7	0.0231508	0.0204397	1.133	0.2590	
A9	−0.00560763	0.0591495	−0.09480	0.9246	
A10	−0.0868981	0.0823304	−1.055	0.2928	
A11	0.0423451	0.136655	0.3099	0.7571	
A14	0.0635944	0.0808118	0.7869	0.4325	
A18	−0.0121948	0.0485155	−0.2514	0.8019	
A19	−0.0923585	0.0421151	−2.193	0.0297	**
A20	−0.0276241	0.0834519	−0.3310	0.7411	
A21	−0.00398452	0.0662550	−0.06014	0.9521	
A22	0.0170921	0.0566101	0.3019	0.7631	
A23	0.00909413	0.0655247	0.1388	0.8898	
A24	0.149973	0.117999	1.271	0.2056	
A26	0.00269316	0.128142	0.02102	0.9833	
A29	0.0325937	0.0594937	0.5479	0.5845	
A31	0.142897	0.139209	1.026	0.3062	
A33	−0.0175700	0.0969224	−0.1813	0.8564	
A35	0.00347918	0.127648	0.02726	0.9783	
A39	0.0138231	0.0740360	0.1867	0.8521	

Av. Dep var	1.495459	Std dev dep var	0.816459
R-squared	0.940294	Adj R-squared	0.895331
F(122, 162)	20.91239	P-value (F)	7.39e-61
Rho	-0.249807	Durbin-Watson	1.469388

Table VI - Fixed effects - reduced model (1/2)

Test for the difference in the group intercepts
Null hp: groups have a common intercept
Test stats: F(94, 162) = 6.41088, with p-value = P (F (94, 162) > 6.41088) = 5.02007e-25

Test for omitted variables
Null hp: parameters equal to zero for the variables
A5
A9
A18
A19
A20
A21
A22
A33
A35
Test stats: F(9, 162) = 0.590013, with p-value = P (F (9, 162) > 0.590013) = 0.804007

Table VII - Fixed effects - reduced model (2/2)

Model: FE, Nr obs: 285, inc. 95 cross-section units
Periods: 3
Dep var: TOBIN_Q
Robust std err (HAC)

	Coeff	std err	t	p-value	
const	14.5784	7.90787	1.844	0.0670	*
l_Assets	-0.523817	0.324874	-1.612	0.1087	
l_Age	-0.0103235	0.159035	-0.06491	0.9483	
ROA	3.58872	1.70605	2.104	0.0369	**
DEBT_TO_EQY	0.0656008	0.0253632	2.586	0.0105	**
Growth	0.106088	0.238344	0.4451	0.6568	
Flottante	-0.501609	0.650764	-0.7708	0.4419	
A2	0.0442911	0.0183048	2.420	0.0166	**
A4	0.0182245	0.0278974	0.6533	0.5145	
A6	0.0218719	0.0429696	0.5090	0.6114	
A7	0.0231009	0.0236320	0.9775	0.3297	
A10	0.0968394	0.0867312	1.117	0.2657	
A11	0.0240658	0.0745903	0.3226	0.7474	
A23	0.0222940	0.0134339	1.660	0.0988	*
A24	0.140254	0.136291	1.029	0.3049	
A26	0.00476112	0.0133411	0.3569	0.7216	
A29	0.0226871	0.0325144	0.6978	0.4863	
A31	0.102033	0.0595663	1.713	0.0885	*
A39	0.00133436	0.0356096	0.03747	0.9702	

Av. Dep var	1.495459	Std dev dep var	0.816459
R-squared	0.938313	Adj R-squared	0.898144
F(122, 172)	23.35938	P-value (F)	1.76E-66
Rho	-0.233128	Durbin-Watson	1.448433

Test for the difference in the group intercepts
Null hp: groups have a common intercept
Test stats: F(94, 172) = 7.81345, with p-value = P (F (94, 172) > 7.81345) = 5.01865e-31

Table VIII - Fixed effects model, positive variables